ECONOMICS of Soil Health Systems

Beech River Watershed of Tennessee

FARM SIZE
725 acres

CROPS GROWN
Corn
145 acres
Soybean
580 acres

SOIL TEXTURE
Silty clay loam

SOIL HEALTH MANAGEMENT SYSTEM
No-till production
Cover crops
Monitoring of soil nutrient levels

NET INCOME INCREASE
Corn
$25.26/acre
Soybean
$16.22/acre

FARM #10

INTRODUCTION

The Alex Johnson farm in the Beech River Watershed of Tennessee increased profi tability for corn and soybean by decreasing production costs for corn and increasing soybean yield with a soil health management system (SHMS) of no-till production and cover crops. No-till production has been practiced for 12 years and cover crops planted for seven years.

Benefits of the SHMS reported by the farmer:

- → **IMPROVED WATER INFILTRATION**
- → **DECREASED EROSION**
- → **IMPROVED SEED BED CONDITIONS AND WEED MANAGEMENT**
- → **DECREASED PHOSPHOROUS REQUIREMENTS**
- → **LESS CROP YIELD VARIABILITY**
- → **INCREASED ORGANIC MATTER**

ADDITIONAL INFORMATION ON THE FARM IS AVAILABLE IN A REPORT AND VIDEO PRESENTATION AT WWW.NACDNET.ORG/SOIL-HEALTH-ECONOMICS.

METHODS

The Soil Health Institute conducted an interview to obtain production information for evaluating economics of the soil health system based on partial budget analysis. In this approach, the benefi ts and costs of a soil health system are assessed by calculating changes in revenue and expenses before and after adoption of that system. The change in net farm income associated with adopting a SHMS is calculated as shown below and presented in Table 1.

Net change in farm income = Benefits – Costs, where:
Benefits = Reduced Expenses + Additional Revenue
Costs = Additional Expenses + Reduced Revenue

A DETAILED DESCRIPTION OF THE METHODOLOGY FOR PARTIAL BUDGET ANALYSIS CAN BE FOUND AT HTTPS://SOILHEALTHINSTITUTE.ORG/ECONOMICS.

FINDINGS

Initial Management System and Reduced Expenses

- → The initial management system was conventional tillage production.
- → Post-plant weed management was exclusively with herbicide in conventional tillage.
- → Three tillage fi eld trips were eliminated for both crops.
- → A post-emergent herbicide spray trip was eliminated for soybean.
- → Phosphorous was reduced 15 lbs./acre in soybean production.
- → Total reduced expenses were $37.36/acre for corn and $57.69/acre for soybean.

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ECONOMICS of Soil Health Systems: Beech River Watershed of Tennessee

Soil Health Management System and Additional Expenses

- The soil health management system adopted for 725 acres was no-till production with cover crops planted before soybean.
- Cover crops were planted in the fall with a no-till planter, after harvest of the preceding crop.
- Species included in the $30.00/acre cover crop mix were winter/cereal rye, crimson clover, winter pea, tillage radish, oat, wheat, and triticale.
- Cover crops were terminated with a roller-crimper before planting soybean.
- Post-harvest expenses due to increased soybean yield were hauling and check-off fee.
- Total additional expenses were $12.10/acre for corn and $61.47/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were $25.26/acre greater than additional expenses for corn.
- Reduced expenses were $3.78/acre less than additional expenses for soybean.
- Yield increased 2 bu./acre, and additional revenue was $20.00/acre for soybean.
- Reduced expenses were achieved without a reduction in yield for corn.

Net farm income increased $25.26/acre for corn and $16.22/acre for soybean.

Table 1. Partial Budget[1] Analysis, 12 Years with a Soil Health Management System on a 725-Acre Farm, $ per Acre per Year (2019 Dollars).

	Corn		Soybean	
	BENEFITS	COSTS	BENEFITS	COSTS
Expense Category	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	0.00	0.00	30.00
Fertilizer & Amendments	0.00	0.00	7.66	0.00
Pesticides	0.00	0.00	7.38	0.00
Fuel & Electricity	5.05	1.03	5.72	2.94
Labor & Services	9.89	4.07	11.36	10.11
Post-harvest Expenses	0.00	0.00	0.00	0.64
Equipment Ownership	22.42	7.00	25.57	17.78
Total Expense Change	**37.36**	**12.10**	**57.69**	**61.47**
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	0.00	0.00	2.00	0.00
Price Received,[2] $/bu.	4.20	4.20	10.00	10.00
Revenue Change	**0.00**	**0.00**	**20.00**	**0.00**
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	**37.36**	**12.10**	**77.69**	**61.47**
Change in Net Farm Income[2]	**25.26**		**16.22**	

1 Expenses and expected yields based on farmer reported production practices. (https://soilhealthinstitute.org/economics/)
2 Commodity prices applied to yields based on long-term average prices. Irwin, S. "IFES 2018: The New, New Era of Grain Prices?" Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 11, 2019.

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